

# 5

## **Augmentative and Alternative Communication Systems**

*by Pat Mirenda, Ph.D. and Brenda Fossett, Ph.D.*

*Pamela is a ten-year-old girl who has autism and limited speech. Despite this, she is a successful communicator both at school and at home. When she wants something within her visual range, she leads a family member, classmate, or teacher to it and vocalizes. When she wants something that is out of sight or in another location, she points to line drawing symbols in a communication book. Pamela also uses line drawing symbols for her daily schedule and as a component of her reading curriculum. During recess and lunchtime, she and her friends enjoy looking through her communication book, in which there are pictures of Pam, her family, and her friends doing fun activities (like trick or treating on Halloween!).*

*During writing or math activities in her classroom, Pamela uses a computer to write, because she has difficulty manipulating a pencil and paper. She also uses a computer at home to play games with her sister and her dad. Last but certainly not least, Pam uses her limited speech to greet people, ask for help, and say “no!” when she doesn’t like what is happening.*

Pamela is a very fortunate child! It is clear that she has been supported by family members and school personnel who understand that her lack of speech doesn’t mean she has nothing to say, and who have made systematic efforts to provide her with an individualized augmentative and alternative communication (AAC) system. Just like you and I, Pamela communicates in a variety of ways, depending on the situation. One AAC technique will *never* meet all of a child’s communication needs, so a combination of approaches will be needed. This

is important to remember when supporting children with autism who are just beginning to learn about communication. In this chapter, the combination of all of the symbols and devices used by a child is referred to as his or her AAC *system*.

---

## What Is AAC?

The term augmentative and alternative communication (AAC) refers to interventions designed to compensate for the expressive communication impairments of individuals. The word *augmentative* suggests that these interventions can be used to improve upon the effectiveness of communication through existing means (including speech), while *alternative* implies developing systems that temporarily or permanently replace speech.

A host of modalities can be used to augment or replace speech, including:

- residual speech,
- vocalizations,
- pictures or related visual symbols (from photographs to print),
- Braille,
- gestures (informal or within a formal system such as American Sign Language), or
- various switch-activated devices (operated by any body action, including eye gaze).

Each of these modalities is explored in detail below.

Under the Individuals with Disabilities Education Act (IDEA), AAC systems are considered a type of “assistive technology.” The 2004 amendment to IDEA assures the right of every child to have an assessment regarding the need for assistive technology. When children are determined to need assistive technology, including AAC, the public school has an obligation to provide the necessary devices or adaptations (and the training to support staff in its use) at no cost to the child’s family. Parents or teachers who believe a child may need such assistance should insist that an AAC specialist consult with the child’s educational team.

For more information about the field of AAC in general, the International Society for Augmentative and Alternative Communication (ISAAC) has provided useful information to professionals and

lay people for almost 20 years. (See contact information at the end of this chapter.)

---

## Why Use AAC?

AAC techniques can reduce the frustration experienced by many children with autism who do not speak. As you read in Chapter 3, teaching communication alternatives is one way to reduce or prevent behavior problems that stem from frustration. For example, AAC techniques can be used to teach children to ask for what they want, ask for help, or ask for a break from an activity instead of having a tantrum, screaming, or engaging in other problem behaviors. Children can be taught to use manual signs, photographs, line drawings, or other symbols for this purpose. When a child learns to communicate via any modality, he then will be able to better participate in play and other school activities, and is more likely to be perceived in a positive light by peers.

---

## What about Speech Development?

One of the most common concerns expressed by parents and teachers regarding the use of AAC techniques with children with autism is how it is likely to affect speech development. The good news is that there is ample evidence that AAC techniques do *not* interfere with the development of speech—in fact, AAC may *promote* speech development in some children. For example, in Chapter 6 you will read about the Picture Exchange Communication System (PECS), an instructional approach for teaching children how to use symbols to communicate. You will also read about some of the outcome data from PECS that suggests that many children who initially learn to communicate in this way develop speech over time. It appears that once children have learned to use 30 to 100 symbols to communicate using PECS, they often begin to speak. Many are eventually able to use only speech for communication and discontinue the use of PECS altogether.

A number of studies have investigated the effect of AAC on speech production in children with autism. Recently, a group of researchers reviewed six studies where AAC intervention involved the use of manual signs (Millar, Light, and Schlosser, 2006). Of the 72

children exposed to manual signs, none showed a decrease in speech production. Children who improved in speech production tended to be those who had good verbal imitation skills.

These researchers also reviewed ten studies where AAC intervention involved the use of “low tech” AAC systems, such as PECS. All of the 167 children involved in the studies reviewed showed improvements in either verbal approximations or speech production. Finally, the same authors reviewed two studies where the AAC intervention involved the use of speech generating devices (i.e., computerized devices where an individual presses one or more buttons and a message is “spoken” by the computer). All nine of the children involved demonstrated improvements in speech production. In 2009, one of the authors of this review (Millar) updated it with additional studies that involved individuals with autism. These studies also showed that AAC does not appear to interfere with speech development, and, for some individuals, can support speech production.

When considering the potential problems that can develop when children with autism do not have a means to communicate (e.g., problem behavior, loss of learning and social opportunities, etc.), it is clear that a “wait and see” approach to AAC intervention can be detrimental. Based on current information, it is better to introduce AAC early. Some children may develop sufficient speech and no longer require AAC, many may continue to use AAC along with speech, while a few may continue to use AAC entirely. Withholding AAC intervention while waiting for the possibility of speech to develop may result in the child developing additional problems such as challenging behavior. Instead, it makes more sense to provide AAC early. This will help the child to communicate with greater ease, thereby reducing frustration.

---

## **Types of AAC Symbols**

Communicating without speech requires the use of alternative symbols. A symbol is something that stands for something else. There are two main types of AAC symbols: unaided and aided. Unaided symbols do not require any equipment to produce, and include gestures, body language, vocalizations, and manual signs (among others). Aided symbols require devices that are external to the individuals who use them, such as communication books, voice output communication

devices, and computers. In the next section, we will review the most commonly used AAC symbols (both unaided and aided) and discuss some of the primary advantages and disadvantages of each.

## ***Unaided Symbols***

### **Natural Gestures and Body Language**

Before children learn to use speech, they engage in a wide array of communicative gestures. Some of these gestures appear to be natural extensions of other actions. For example, pointing is very similar in form to reaching for something. Others seem to develop as an extension or a pantomime of actions. For example, if a basketball player is about to shoot a foul shot in a basketball game and sees an opponent holding his hands around his own neck, he may tell himself not to “choke.” Still other gestures are more formal, and, like spoken words, have meanings only within a given culture. For example, in North America, most people know that the “V” sign made with the fingers means either “victory” or “peace” (depending on the age of the person making the gesture)!

Although many gestures involve hand motions, we also use other parts of our bodies to convey messages. We can shrug our shoulders in doubt, frown in puzzlement, or hold out our hands and arms to ask for assistance. Perhaps the most familiar gesture involves nodding and shaking the head to mean, “yes” or “no.”

People use gestures to communicate many types of messages. Perhaps the most obvious is communication about wants and needs. For example, we may hold out two toys to a child, say, “Which one do you want to play with?”, and expect the child to point to or simply take the desired toy. Similarly, before they are two years old, typical children learn that they can get help from adults by simply bringing objects to them. They also learn that they can get people to look at objects or events of interest by pointing to them. Other gestures, such as waving hi or bye, blowing a kiss, and playing peek-a-boo, are used for purely social reasons. Still, they are extremely important in developing smooth social interactions between friends or between children and adults.

***Why are gestures important?*** A common mistake in teaching communication skills to children with autism is neglecting to incorporate natural gestures as components of a communication system. This

mistake often occurs because many parents and teachers tend to view communication as an “either-or” skill: either the child communicates this way *or* the child communicates that way—which, of course, is not the case! Because these children have so much difficulty learning what communication is all about, it is important to respond to and encourage them to use *all* forms of communication, as long as those forms are understandable and socially acceptable. For example, when Joshua leads his father to the cupboard to ask for a treat, or when Juanita cries after she falls down and skins her knee, they are communicating messages (“I want something” and “Ow! That hurt!”) that should be respected and acknowledged.

***How can gestural use be encouraged?*** Children with autism are likely to benefit from playful interactions that encourage them to use gestures to communicate. An example is the “Row, row, row your boat” game that Joshua’s dad plays with him every evening before bedtime. Josh and his father sit on the floor facing each other with their feet touching, and they hold hands. While Josh’s dad chants the “Row, row, row your boat” song, they rock back and forth to the tune. Every few lines, Josh’s dad pauses in the song and waits for Josh to pull on his hands or make a noise before he continues. When they first started playing this game, Josh didn’t know what to do, and would often just sit there when his dad paused. But little by little, Josh started to use body language and vocalizations during the pauses, and his dad responded right away by continuing the game. By responding to Josh’s behaviors, his dad did a great job of teaching Josh to ask for “more!” Soon, Josh began to pull on people’s hands and to vocalize in other situations as well, when he wanted “more.”

This playful orientation can be adapted to other situations. For example, if your child likes to be picked up and spun around, you could first spin him around, then put him down and wait for him to raise his hands to indicate he wants to be picked up again. Initially, you might have to raise his arms for him, saying something like, “You want to go up again?” Little by little, you would withdraw your physical assistance until he was reaching his arms up to you himself. These examples show how easy it is to practice using gestures in the context of playful interactions and routines.

***How can gestures be taught directly?*** It is likely that typical children learn to use gestures for communication by imitating the gestures made by adults and other children. Most children with autism

have difficulty learning to communicate through gestures, at least in part because of their known difficulty with imitation (Stone, Ousley, & Littleford, 1997; Stone, Ousley, Yoder, Hogan, & Hepburn, 1997). Thus, how we teach a child with autism to use gestures will largely depend on other skills he displays.

If your child *can* imitate head and hand actions, then demonstrating various gestures and their meanings will be quite helpful in teaching. On the other hand, if he *cannot* imitate, demonstrating gestures is not likely to be successful. In such cases, teaching him to imitate will be important for the acquisition of many skills, including the use of gestures. However, while you teach imitation, you can also help your child acquire useful gestures by physically assisting him to make the motions required.

The key to using physical assistance to teach gestures is creating situations in which the gestures will prove important to your child. If gestures are not taught within situations where they are typically used and truly important, it is unlikely your child will learn to use them spontaneously. For example, consider the gesture, “waving hello.” It is clear that there are several types of situations in which this is an appropriate action. If Dad enters a room and waves hello to Mark, then it would be appropriate for Mark to wave back. In addition, when Mark walks into a room, even if Dad doesn’t wave hello, it would be appropriate for Mark to initiate and wave hello to him. Such natural situations would be excellent times for someone who acts as the “teacher” (such as Mom or another adult) to physically prompt Mark to wave “hello.”

Physical prompts may start out fully hand-over-hand, but may be *faded* (i.e., reduced in strength) gradually in intensity and type over a series of opportunities. In general, the more important the outcome is to your child, the more likely it is that he will tolerate physical prompting. Over time, the positive and enthusiastic reaction he gets from dad is likely to result in him learning to use this gesture as a greeting.

For additional information on teaching children with autism to imitate social gestures, you may want to read *Reaching Out, Joining In: Teaching Social Skills to Young Children with Autism* by Mary Jane Weiss and Sandra L. Harris (Woodbine House, 2001).

### **What about teaching children to understand gestures?**

It is important to teach children to understand gestures as well as to use them. Otherwise, it is difficult to communicate messages efficiently and rapidly in many situations. For example, one important

gesture for a child to understand is what we mean when we point to something. Usually, we at least want the child to look at what we are pointing to. Sometimes, we also want the child to retrieve an item that is pointed out (“Get that”), to put something in the direction we point (“Put it there”), or to remain in the place we point to (“Wait right here”). We usually accompany pointing with verbal directions to clarify the exact message—but the pointing itself is a critical part of the interaction. Similarly, gestures that involve social routines, such as waving goodbye, giving a “high five,” or clapping to show approval, are important for the child to understand if communication is to be effective and efficient.

To teach your child to understand gestures, you first must be certain that the gesture you are teaching is truly important to him. For example, let’s go back to the “pointing” example and consider Harry’s situation. Harry likes to complete puzzles and thus enjoys getting each puzzle piece to complete the task. His mom decides to put all of the puzzle pieces in a box except for the first few, to provide a motivating context for teaching Harry to understand what she means when she points. When Harry begins to look for the next puzzle piece, she points to the box and then immediately taps it with her finger. Harry looks at the box when he hears the tap, lifts the lid, and takes a puzzle piece. Over the next several trials, instead of immediately tapping after pointing, mom gradually increases the delay between the two actions. Over time, Harry learns to respond to mom’s pointing as a signal to get the next piece. This time-delay technique can be adapted to teach children to understand other types of gestures as well.

### **Manual Signs**

You are probably familiar with the language systems of manual signs used by people who are deaf. Some individuals who are able to hear but have difficulty understanding and/or producing speech—such as children with autism—may also use manual signs. There are several different systems in which people use movements by their fingers and hands (augmented by other body actions) that represent letters, words, or phrases.

Manual signs can be used for both expressing and understanding language. Manual sign *input* occurs when people communicate with the child using signs to augment their speech. For example, Felicia’s teacher speaks at the same time she signs the key words in her mes-



sage. So, when it is time to do math, she tells Felicia, “Get out your book and a pencil” while signing *get*, *book*, and *pencil*. She does this because Felicia seems to pay attention more readily and follow directions more accurately if she is provided with signed information in addition to speech. To be sure, some children only *seem* to listen better when sign is added to speech, when in fact they are only relying on the visual cues. For each child, it is important to try to determine whether combining modes of input actually helps.

Manual sign *output* occurs when the child with autism uses manual signs to communicate to others. For example, when Matt wants to use the family computer at home, he asks his mom to turn it on by signing, “*want computer*.”

Manual signing used to be the most commonly used system of communication for people with autism who do not use speech. One reason is that manual signs are totally “portable” and require no external devices to use. However, many people with autism seem to find it easier to use AAC systems that use symbols that are more concrete and permanent than manual signs. For instance, visual-spatial communication symbols such as pictures or line drawings work better for many children with autism. Furthermore, most parents, teachers, and classmates do not understand manual signs, and some children with autism do not have the manual skills (whether fine motor or finger dexterity) that are needed to produce them.

Decisions about whether or not to teach children to use manual signs for output are complicated and should be made by the team of people providing educational supports to your child. Factors to be considered include:

- whether your child can learn signs via imitation or physical prompting,
- your child’s degree of motor skill,
- how rapidly he can acquire vocabulary in sign language vs. in other modalities,
- the portability of the system (you can take your hands with you everywhere!) compared to other systems being considered,
- and the likelihood that the signs will be understood by significant others (at school, home, and in the community).

## **Aided Symbols**

### **Real Objects**

The easiest type of aided symbol for most people to learn is a *real object symbol*, a three-dimensional object (or partial object) that stands for an activity, place, or thing. For example, Maria uses real object symbols to ask for what she wants and to share information with others. If she's thirsty, she brings her teacher a cup to ask for something to drink. If she wants to go out in the car, she brings her mom the car keys. After she goes to the park, she can tell her sister what she did by showing her the Frisbee that she enjoys using there.

For Maria, the cup, keys, and Frisbee are symbols representing "I'm thirsty," "I want to go out in the car," and "I went to the park." These specific symbols were selected for Maria because she always drinks from a cup, sees her mom use those keys, and carries the Frisbee to the park. She has learned from experience to associate the symbols with the activities they represent. Limitations of using such objects include their limited portability (which may be improved by use of miniatures) and the risk that they will be unavailable when needed.

### **Photographs**

Photographs are more difficult to learn to use than real object symbols because of their greater symbolic relation to those objects, but can still be very useful. As part of an AAC system, photos may be used to represent specific people, places, activities, or items. For example, Hoa uses photos of food items to ask for her lunch in the high school cafeteria. She can talk to her classmates about her family by using photos of them, and can tell her teachers that she went to San Diego for her holiday by showing postcards and photos of the places she visited.

The advantage of photographs is that they are easier to carry around than are real object symbols. The disadvantage is that they have to be taken with a camera, bought, downloaded from the Internet, or cut out of magazines or other media, so they can be time-consuming to produce. Fortunately, digital cameras are now available to most of us. These cameras permit computer files of pictures to be stored and modified, using various software programs. Useful photographs can then be readily copied and shared, while those that are not used frequently can simply be deleted. The cost of color printing is now fairly reasonable and may permit colored symbols (both photographic and

drawings). However, while color may enhance some children's ability to use a symbol, this is not the case for all children. That is, some children may respond very well to black-and-white photographs (or drawings) early in training.

### **Line Drawing Symbols**

Line drawings may be black and white or color illustrations of objects meant to represent people, places, activities, and items, as well as actions (eat, sit, sleep, etc.), feelings (happy, angry, bored, etc.), descriptors (hot, little, up/down, etc.), and social etiquette messages (please, thank you, etc.). Many types of line drawing symbol sets are commercially available in a variety of sizes and forms (including some that permit a printed word on the card) from different companies. The symbols in these sets usually include those for people, places, activities, and items, as well as those for action verbs (eat, sit, sleep, etc.), feelings (happy, angry, bored, etc.), descriptors (hot, little, up/down, etc.), and social etiquette messages (please, thank you, etc.). The most commonly used line drawing symbols are called Picture Communication Symbols (PCS). A software program called Boardmaker™ is used by many people to produce communication displays of PCS symbols.

### **Alphabet Symbols**

The last types of symbols we'll talk about here are alphabet symbols— A, B, C, D, and so forth. We use letters combined into printed words to represent many ideas and things every day—you're using these symbols right now in order to read this book! People with autism who know how to read can also use words and letters to communicate.

Even if a child doesn't know how to read *everything* he needs to communicate, words might be useful to communicate *some* things. For example, Jordan can recognize words for many foods he eats regularly, such as “Kellogg's Rice Krispies” and “peanut butter.” He has several pages of these food words in a communication book that he carries around with him. When he wants to ask for something he likes to eat, he simply points to the word in his book.

The advantages of words are that many of them can be placed on a single page, and they are easily understood by people who can read. The disadvantage is that people with autism who cannot read will not be able to use them effectively. It is important to be able to distinguish between *word-calling*—when a child can name a written word—and

*comprehension*—when a child can appropriately use a word or act on the word as equivalent to what it represents.

---

## AAC Techniques

Now that you know about unaided and aided symbols, we can talk about what to *do* with those symbols and how they can be used to help a child communicate. Basically, two types of AAC techniques are available: nonelectronic or “low tech” and electronic or “high tech.”

### **Nonelectronic (“Low Tech”) Techniques**

*Nonelectronic or “low tech” techniques include:*

- Communication books (for example, these may have cardboard or vinyl covers that permit some pictures to be shown on the cover while other pictures are stored within the book). Such books may contain symbols to point to or symbols that are attached (e.g., with Velcro™) and can be readily removed, as when using the PECS method described in Chapter 6.
- Communication boards on which pictures are either printed or affixed, and then covered with a clear laminate to protect the pictures from wear.
- Communication wallets (these may contain photographs or other symbols in clear plastic credit card holders).
- Fanny packs (for example, small pouches that can be strapped around the waist and that contain object symbols or other important items).
- Other devices that are neither battery-operated nor computer-based (such as date-books, notepads, Post-it notes, etc.).

Most of us use nonelectronic AAC techniques regularly, although we probably don't recognize it! Do you carry a “Daily Planner” to keep track of your appointments? Do you use a grocery list when you shop? Have you ever shared family photographs in your wallet with coworkers or neighbors, or pointed to a picture or foreign word in a menu to order your food in a restaurant? All of these are examples of nonelectronic techniques for communication!

As with all AAC techniques, there are both advantages and disadvantages to using “low tech” techniques for communication. The advantages are that they are relatively inexpensive; can be designed so they are easy to transport or carry around; and can be used in flexible, individualized ways. For example, one youngster had a few symbols of outside play equipment attached to a loop that hung on his belt so that he could use his hands freely on the equipment but also choose where he wanted to play next (e.g., on the swings, slide, etc.). The disadvantage is that someone must take responsibility for keeping these AAC systems updated with messages (symbols) that the child needs to communicate. Of course, this is also the case with electronic techniques.

### **Electronic (“High Tech”) Techniques**

Numerous *electronic* or “*high tech*” communication techniques that require some type of external power source (e.g., batteries or electricity) are also available. The primary advantage of electronic communication devices is that they produce output that can be readily understood by almost anyone your child might want to communicate with. Words might be displayed on a screen or printed out on paper, or the device might use voice output. For example, when a child touches a symbol on a voice output device, it “speaks” the message that has been programmed for the symbol.

Some “high tech” devices are quite complex and expensive, while others are relatively simple to program and operate. For example, the BIGmack (AbleNet, Inc.) is a small device with a built-in microswitch, which, when activated, plays a single recorded message up to 20 seconds long. Recording a message into the BIGmack takes only seconds, using the voice of whomever sets up the device. New messages can be recorded over old ones throughout the day. So, for example, with the assistance of an aide who is responsible for recording the messages, a kindergarten-aged student could use a BIGmack to:

- a. greet his teacher and classmates on arrival at school (“Hi, how are you today?”), then to
- b. recite the “Pledge of Allegiance” with his classmates, then to
- c. participate in a language arts lesson by “reciting” the repeating line of a story the teacher is reading (“Brown bear, brown bear, what did you see?”) and then to
- d. call out “Duck, duck, duck, duck, goose!” while a classmate touches each child’s head in the circle.

As you can see, the BIGmack might not do very much, but with some creativity and planning, it can be a very useful tool for classroom participation! Additional examples of basic electronic devices include the MessageMate (Words+, Inc.) and Talara (Zygo Industries, Inc.).

Other devices are capable of delivering more than twenty messages (in some cases, thousands!) and are more difficult both to program and use because they are more complex. Of course, the advantage of such devices is that they can contain a greater number of pre-programmed messages (e.g., “hello,” “I need help,” “I need a break,” “I want to go to the bathroom,” etc.). In addition, many of these devices have other features as well, including printers, calculators, large memory capacities for storing lengthy text and speeches, and the ability to interface with standard computers. Some examples include the ChatBox 40 (Prentke Romich Co.), Macaw (Zygo Industries, Inc.), and Dynavox Maestro (Dynavox Systems, Inc.). The vast majority of devices today use either digitized speech (i.e., human speech) or very high quality synthetic speech. The size of the buttons is not an issue since virtually all such modern devices allow you to customize the size of the target area to match the user’s motor skills.

Aside from the cost (which can range from less than \$200 to more than \$10,000!), one of the major disadvantages of electronic devices is that they are more cumbersome and more vulnerable to simple wear and tear than are nonelectronic techniques. They can break down (which may require expert repair specialists); their batteries can run down or fail; the switches used to operate them can fail to function; a change in location can make it impractical to transport them; and they require someone to program messages into them on a regular basis. In addition, it is important to emphasize that having an electronic device does not make a person a good communicator any more than having a basketball makes someone LeBron James! Electronic devices are *tools* for communication, and children with autism will need to be taught how to use them in meaningful ways, just as they are taught to use other communication techniques. They should *not* be seen as “quick fix” solutions to the communication difficulties these children experience.

### **What about the iPad?**

Since the release of Apple’s iPad in 2010, professionals and parents have been exploring ways in which the tablet device might

facilitate communication for individuals with a wide range of needs, including those with autism spectrum disorders (e.g., Kagohara et al., 2010). Since the iPod Touch was introduced in 2007, a number of applications, or “apps,” have been developed. The iPod Touch has a small touch screen that can be difficult to manipulate without good pointing and other fine motor skills. However, the iPad has a nine-inch touch screen that is more accessible to individuals with varying motor abilities. The iPad, ranging in cost from \$499 to \$829 depending on the model, is also much less expensive than most current speech-

**Table 5.1 | iPod/iPad AAC Applications**

| <b>App</b>                                                                                                                   | <b>Description</b>                                 | <b>Price</b> |
|------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|--------------|
| Answers: YesNo HD<br><a href="http://www.simplifiedtouch.com">www.simplifiedtouch.com</a>                                    | Two-button speech generating app                   | \$1.99       |
| My Choice Board<br><a href="http://www.goodkarmaapplications.com">www.goodkarmaapplications.com</a>                          | Speech generating choice boards                    | \$9.99       |
| I Can Speak<br><a href="http://lazyriver.on-rev.com/">http://lazyriver.on-rev.com/</a>                                       | Speech generating app                              | \$29.99      |
| Grace App<br><a href="http://graceappforautismoniphone.blogspot.com/">http://graceappforautismoniphone.blogspot.com/</a>     | Nonspeech generating, PECS-based communication app | \$37.99      |
| Sounding Board<br><a href="http://www.ablenetinc.com">www.ablenetinc.com</a>                                                 | Speech generating app                              | \$49.99      |
| TouchChat HD<br><a href="http://www.silver-kite.com">www.silver-kite.com</a>                                                 | Speech generating app                              | \$149.99     |
| Proloquo2Go<br><a href="http://proloquo2go.com">http://proloquo2go.com</a>                                                   | Dynamic display speech generating app              | \$189.99     |
| DayLeaf<br><a href="http://www.friendleaf.me">www.friendleaf.me</a>                                                          | Visual scheduling                                  | \$0.99       |
| Picture Scheduler<br><a href="http://www.jankuj.com/Picture_Scheduler.html">http://www.jankuj.com/Picture_Scheduler.html</a> | Visual scheduling                                  | \$2.99       |
| First Then Visual Schedule<br><a href="http://www.goodkarmaapplications.com">www.goodkarmaapplications.com</a>               | Visual scheduling                                  | \$9.99       |
| iPrompts<br><a href="http://www.handholdadaptive.com">www.handholdadaptive.com</a>                                           | Visual scheduling, visual timer, choice making     | \$49.99      |

generating devices. Combined with AAC apps that range in price from \$1.99 to \$299.99, it is now possible to purchase a lightweight and powerful AAC “device” that talks for under \$1000.

Several apps for the iPod Touch and the iPad can be used to support language understanding. There are apps to create visual schedules and Social Stories™, and there are even more apps to support expressive communication. These apps range from the simple to the complex. Some allow an individual to communicate a single message (e.g., *Tap-Speak Button*), some enable selection of one of a few messages (e.g., *Answers: Yes No HD, Sounding Board*), and some provide hundreds of messages (e.g., *TouchChat HD, Proloquo2Go*). Table 5.1 on the previous page lists some AAC apps and their prices. All of these apps, and many more, are available from the iTunes store ([www.apple.com/itunes](http://www.apple.com/itunes)).

---

## Designing an AAC System

Now that you have a basic understanding of the symbol and technique options that are available, we can consider some of the most important decisions that are needed to design an AAC system. These have to do with the types of symbols to be used and the types of messages that will be available for communication.

### **Symbol Selection**

It’s important to think carefully about what types of symbol to use with each child, because the same symbols are not necessarily best for everyone. The most important consideration is that the symbols should be easy for the child to learn how to use for communication. The more you know about a child’s interactions with pictures and other symbols, the more likely it is that you will make a successful selection. For example, if a child spends time looking at pictures or photographs in books and magazines, then these types of symbols may be easy for the child to use within a communication system. If you lay out a group of symbols varying from color photographs to clip art to black-and-white line drawings and notice that the child primarily looks at and picks up the line drawings, then it may be helpful to start with such symbols.

Ultimately, the answer to the question “which type of symbol is best?” will only be answered by observing how readily a child



learns to use symbols within a communication system. For example, in Chapter Six you will be introduced to PECS, a system for teaching communication skills to children with autism. Various types of symbols can be introduced through PECS, to see which one(s) the child learns to use most readily.

## Messages

Perhaps the most important decision to be made involves the messages the child needs to communicate in various contexts. Communicative messages can be divided into four main categories, according to their functions: (a) wants and needs; (b) information sharing; (c) social closeness; and (d) social etiquette (Light, 1988).

**Wants and needs messages** are the easiest to learn how to communicate. Young children first communicate about wants and needs when they learn to say things like: “I want \_\_\_\_\_”; “Give me \_\_\_\_\_”; “No;” and “I don’t want \_\_\_\_\_.” Both nonelectronic and electronic communication devices should contain symbols that the child can use to make requests for food, activities, desired items, and people. There should also be symbols that allow the child to say “no,” ask for a break, ask for help, and ask to be left alone.

**Information sharing** messages enable the child to share information with classmates, teachers, family members, and others. For example, most parents ask their children, “What did you do at school today?” when they come home after school. In addition, children often have a need to exchange more complicated information, such as when they want to ask or answer questions in class. Symbols that correspond to the vocabulary of the lesson (e.g., animals when talking about the zoo, symbols related to the holiday of the month, etc.) can help children share information and allow them to participate in these types of interactions.

Often, the purpose of communication is not to get what we want or to share information — it’s simply to connect with other people and enjoy each other. Children with autism also need to be able to have such **social closeness** interactions. They need to be able to get the attention of others, interact in positive ways, and use humor to connect to other people. At least some of the symbols in their communication systems should be related to messages for social closeness (e.g., “Let’s go play!” “That was great!” “I love you,” etc.).

Finally, a fourth purpose of communication has to do with the routines for **social etiquette** that are important in specific cultures. In North America, for example, people are expected to say “please,” “thank you,” and “excuse me” in certain situations. It’s also considered polite to say “hello” or “goodbye” when meeting or leaving someone and to shake someone’s hand if it’s offered. Students who use communication displays need to be provided with symbols that enable them to interact with others in ways that are culturally acceptable and respectful.

How can you determine exactly which messages from these four categories should be included on a display? Some questions to consider include:

- *Which messages will the child need to communicate on a regular basis (i.e., daily) or frequently (i.e., several times in a day)?* Some examples might include greetings, requests for help, “yes,” “no,” requests related to basic wants and needs (bathroom, water, food, etc.), and social etiquette messages (e.g., “please,” “thank you”).
- *Which messages will facilitate participation (e.g., information sharing) in family or school activities?* For example, a second grader might tell his mother what he did at school today by showing her “remnants” of various activities, such as paper scraps from his art project or the flyer he got at the school assembly.
- *Which messages will enable the child to participate in social interactions?* For example, a high school student at a pep rally might need a message in his BigMACK that says “Go, team, go!” Or, children of any age might want to talk about their family; fun events they did in the past; and favorite topics such as basketball stars or cars by using a scrapbook with photographs, cards, magazine pictures, and remnants that represent motivating topics.

You can see from these guidelines that most children will probably need to communicate dozens of messages each day! Initially, it is important to start by teaching the child to use symbols for the most motivating messages. However, it is important not to limit communication only to concrete “wants and needs” messages, such as *eat, drink, toilet, juice, cookie, puzzle*, and so forth. How boring! The communica-

tion system must be able to accommodate a sufficiently large number of messages to meet student's social, learning, and other needs as well.

---

## Teaching Your Child to Use His AAC System

The first step in introducing an AAC system is for family members and all professionals to meet to discuss your child's current communication, motor, and learning skills and any specific deficits. This information will help in choosing and designing an appropriate AAC system. Each team member will make unique contributions to this decision based on his or her own knowledge of, and interactions with, your child. If your child is in a school-age, preschool, or early intervention program, this team should include the parents, the child, the teacher, the speech-language pathologist, other related-service providers, a psychologist and/or learning consultant, and an administrator.

Once your child's needs have been identified, the service agency will work with you, the parents, to identify what the agency will provide in order to meet these needs. The team members develop a plan for acquiring the necessary materials for introducing the communication system and for teaching the student to use it. Together, the team members create annual measurable goals and develop strategies that will be most effective in realizing those goals. If your child is in an early intervention program or considered to have a severe disability, the team also will develop measurable intermediate steps (benchmarks) that will help the team members to monitor progress throughout the next 6 months to a year. All of this information is included in your child's Individualized Education Program (IEP) or Individualized Family Service Plan (IFSP).

The following are some examples of annual goals and benchmarks:

**Annual Goal:** *Kim will request desired items from adults and peers.*

**Benchmark 1:** *Upon seeing a desired item, Kim will approach an adult and activate a single-picture message on her communication device at least 20 times per school day without prompting.*

**Benchmark 2:** *In a group art activity, Kim will ask a classmate for 2 items necessary for the project with no prompting during 3 of 3 art activities.*

The IEP and/or IFSP includes a description of who must do what, when, and where. In many cases, the speech-language pathologist will be

the professional “in charge” of your child’s AAC system. This means that she might be the person who introduces AAC to your child by determining which vocabulary to teach, teaching your child how and in what situations to access the vocabulary, etc. The speech-language pathologist also interacts with all other team members to insure that your child is using his AAC system as effectively as possible in all environments. Just as the “plan” for developing AAC should be created by a team approach, it should also be implemented as a team. For your child to become a successful communicator, it is imperative that everyone who interacts with him:

- knows how his AAC system works (e.g., how he turns on the electronic device and accesses the vocabulary, what his manual signs mean, or what the pictures he uses mean),
- expects him to communicate with them by creating situations in which communication will be necessary, and
- makes recommendations to the person “in charge” as to what additional steps must be taken to maximize the effectiveness of the AAC system. This includes ensuring that the student has the opportunity to interact with peers during a variety of activities.

---

## Finally...

As you can see, there are many issues to consider when designing a communication system for a child with autism. You need to think about the types of symbols you will use, the messages that need to be conveyed, and many other factors. It can be overwhelming if you think that you have to “get it just right” from the very beginning. The truth is that even the most experienced communication system designers often need to experiment with various options before they find the best solution for a particular child. So, don’t be discouraged, and remember—helping a child who cannot speak to communicate is probably *the* most valuable gift you can offer!

---

## References & Resources

*Note: Some of these publications were written for a professional audience. Those publications written for parents are identified with an asterisk (\*).*

*Augmentative and Alternative Communication*. Quarterly professional journal. Decker Publishing, Inc., One James St. South, P. O. Box 620, L. C. D. 1, Hamilton, Ontario L8N 3K7 CANADA.

Beukelman, D. & Mirenda, P. (2005). *Augmentative and Alternative Communication: Supporting Children and Adults with Complex Communication Needs*. 3rd ed. Baltimore: Paul H. Brookes.

\*Bloomberg, K. & Johnson, H. (1991). *Communication without Speech*. Victoria, Australia: ACER.

\*Cafiero, J.M. & Meyer, A. (2008). Your child with autism: When is augmentative and alternative communication an appropriate option? *The Exceptional Parent*, 38(4), 28-30.

\*Cafiero, J.M. *Meaningful Exchanges for People with Autism: An Introduction to Augmentative & Alternative Communication*. Bethesda, MD: Woodbine House, 2005.

\*Hill, K. & Romich, B. (1999). Choosing and using augmentative communication systems. Part 1: The goal, the team, and AAC rules of commitment. *The Exceptional Parent*, 29 (10), 76-80.

\*Hill, K. & Romich, B. (1999). Choosing and using augmentative communication systems. Part 2: AAC success stories: Making the rules of commitment work. *The Exceptional Parent*, 29 (11), 60, 62, 64-67.

\*Hill, K. & Romich, B. (1999). Choosing and using augmentative communication systems. Part 3: Assessment, intervention, and resources. *The Exceptional Parent*, 29 (12), 49-49.

Kagohara, D. M., van der Meer, L., Achmadi, D., Green, V.A., O'Reilly, M.F., Mulloy, A., Lancioni, G., Lang, R., & Sigafos, J. (2010). Behavioral intervention promotes successful use of an iPod-based communication device by an adolescent with autism. *Clinical Case Studies*, 9, 328-338.

\*McNairn, P. & Shiolen, C. (2000). Augmentative communication. Part 1: Can we talk? Parents' perspectives on augmentative and alternative communication. *The Exceptional Parent*, 30(2), 72-73, 77-78.

\*McNairn, P. & Shiolen, C. (2000). Augmentative communication. Part 2: Can we talk? Parents' perspectives on AAC: Making sense of technology and making it work. *The Exceptional Parent*, 30(3), 80-83.

\*McNairn, P. & Shiolen, C. (2000). Augmentative communication. Part 3: Can we talk? Parents' perspectives on AAC: Selecting the right system, now and as your child grows. *The Exceptional Parent*, 30(4), 74-78.

\*McNairn, P. & Shiolen, C. (2000). Augmentative communication. Part 4: Can we talk? Individuals who use augmentative and alternative communication speak out. *The Exceptional Parent*, 30(4), 74-78.

Millar, D.C. (2009). Effects of AAC on the natural speech development of individuals with autism spectrum disorders. In P. Mirenda & T. Iacono (Eds.) *Autism Spectrum Disorders and AAC* (pp. 171-192). Baltimore: Paul H. Brookes.

Millar, D.C., Light, J.C., & Schlosser, R.W. (2006). The impact of augmentative and alternative communication intervention on the speech production of individuals with developmental disabilities: A research review. *Journal of Speech, Language, and Hearing Research*, 49, 248-264.

Mirenda, P. & Iacono, T. (Eds.). (2009). *Autism Spectrum Disorders and AAC*. Baltimore: Paul H. Brookes.

\*Murphy, P. (2007). Augmentative and alternative communication. *The Exceptional Parent*, 37(8), 48-51.

Sennott, S. & Bowker, A. (2009). Autism, AAC, and Proloquo2Go. *Perspectives on Augmentative and Alternative Communication*, 18, 137-145.

\*Weiss, M.J. & Harris, S.L. (2001). *Reaching Out, Joining In: Teaching Social Skills to Young Children with Autism*. Bethesda, MD: Woodbine House.

## **Technical Resources**

AbleNet, Inc., 1081 Tenth Ave. N. E., Minneapolis, MN 55414-1312 (800-322-0956; [www.ablenetinc.com](http://www.ablenetinc.com)).

Dynavox Systems, Inc., 2100 Wharton St., Pittsburgh, PA 15203 (888-697-7332; [www.sentient-sys.com:80/000%20Index.folder/Home.html](http://www.sentient-sys.com:80/000%20Index.folder/Home.html)).

ISAAC (International Society for Augmentative and Alternative Communication), 49 The Donway West, Suite 308, Toronto, ON, M3C 3M9, Canada. (416-385-0351; <http://Isaac-online.org>).

Mayer-Johnson Company, P. O. Box AD, Solana Beach, CA 92075-0838 ([www.mayer-johnson.com](http://www.mayer-johnson.com)).

Prentke Romich Company, 1022 Heyl Road, Wooster, Ohio 44691 (800-262-1933; [www.prentrom.com](http://www.prentrom.com)).

Words+, Inc., 40015 Sierra Highway, Bldg. B-145, Palmdale, CA 93550 (800-869-2521; [www.words-plus.com](http://www.words-plus.com)).

Zygo Industries, Inc., P. O. Box 1008, Portland, OR 97207 (800-234-6006; [www.zygo-usa.com](http://www.zygo-usa.com)).